University *of Ljubljana*

SEB SCHOOL OF ECONOMICS AND BUSINESS

BANKA SLOVENIJE

EVROSISTEM

The Research Centre of the School of Economics and Business,
in cooperation with **the Bank of Slovenia,**
cordially invites you to a free research seminar
on **Wednesday, 20 March 2024,** at **13:00 CET** in room **P-119**
at the **School of Economics and Business, University of Ljubljana**

Author
Andrej Srakar *(Institute for Economic Research)*

will present the article
Bayesian probabilistic numerical method with product-Whittle-Matern-Yasuda kernel for Rosen's hedonic regression

Hedonic regression has featured an extensive amount of applications. Originally, following Sherwin Rosen's contribution (Rosen, 1974) it is estimated in a spatial equilibrium context in two stages which leads to a nonlinear Euler ordinary or partial differential equation framework. To date, its Bayesian extensions have not adequately addressed features of its original proposal. We develop an approximate Bayesian probabilistic numerical method with product-Whittle-Matern-Yasuda kernel, which extends literature in several aspects and is able to address different features of the original proposal: it is developed for nonlinear differential equations, is based on spatial kernels and a Gaussian process regression framework, and is applicable to any hedonic regression specification. Usage of product-Whittle-Matern-Yasuda spatial kernel addresses computational issues of the approach. We use Bernstein-von Mises type asymptotic theorems to assess performance of the approach (Frazier et al., 2018) and study asymptotic normality of the posterior mean and Bayesian consistency. Different possibilities of Markov chain Monte Carlo (MCMC) and Quasi-MC sampling schemes are considered. Using Bayesian model comparison approaches, we compare its performance to several parametric and nonparametric Bayesian priors and apply it to simulated and real data examples from the areas of real estate and retail. We study its properties for different possible regression specifications and discuss prior elicitation possibilities (Mikkola et al., 2023). Extensions of the approach discuss other differential equation numerical resolvers, extension to stochastic Euler differential equation, extensions to other hyperbolic differential equation contexts and implicit price frameworks, and deep Gaussian process extensions. Contribution has been part of econometric sessions of the 2023 Asian Meeting of the Econometric Society (AMES 2023).

Please sign up for the free seminar at **http://raziskave.ef.uni-lj.si/a/1678**
by 19 March 2024.
We look forward to seeing you!

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